

# TCEQ Interoffice Memorandum

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**To:** Tony Walker  
Director, TCEQ Region 4, Dallas/Fort Worth  
Alyssa Taylor  
Air Section Manager, TCEQ Region 4, Dallas/Fort Worth

**From:** Shannon Ethridge, M.S. *SE*  
Toxicology Division, Chief Engineer's Office

**Date:** November 23, 2011

**Subject:** Toxicological Evaluation of Results from an Ambient Air Sample for Volatile Organic Compounds Collected at Latitude 32.99571, Longitude -97.27323, Downwind of the Quicksilver - Alliance Tech Center B Pad Site near Roanoke, Denton County, Texas

Sample Collected on May 5, 2011, ACL 1105027 (Lab Sample 1105027-001)

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## Key Points

- Reported concentrations of target volatile organic compounds (VOCs) were either not detected or were detected below levels of short-term health and/or welfare concern.

## Background

On May 5, 2011, a Texas Commission on Environmental Quality (TCEQ) Region 4 Air Investigator collected a 30-minute canister sample (Lab Sample 1105027-001) downwind of the Quicksilver - Alliance Tech Center B Pad Site near Roanoke, Denton County, Texas (Latitude 32.99571, Longitude -97.27323). The sample was collected in response to a citizen complaint of a diesel odor. The investigator did not experience health effects or odors during the sampling event. Meteorological conditions measured at the site or nearest stationary ambient air monitoring site indicated that the ambient temperature was 73.4°F with a relative humidity of 40.1%, and winds out of the southeast (140°) at 4.8 to 9.7 miles per hour. The sampling site and nearest location where the public could have access were more than 500 feet from the possible source(s). The sample was sent to the TCEQ laboratory in Austin, Texas, and analyzed for a range of VOCs. The list of the target analytes that were evaluated in this review are provided in Attachment A. The VOC concentrations were reported in parts per billion by volume (ppb<sub>v</sub>) (Attachment B and Table 1). Please note that the available canister technology and analysis method can not capture and/or analyze for all chemicals.

## **Results and Evaluation**

Reported VOC concentrations were compared to TCEQ's short-term health- and/or welfare-based air monitoring comparison values (AMCVs) (Table 1). Short-term AMCVs are guidelines used to evaluate ambient concentrations of a chemical in air and to determine its potential to result in adverse health effects, adverse vegetative effects, or odors. Health AMCVs are set to provide a margin of safety and are set well below levels at which adverse health effects are reported in the scientific literature. If a chemical concentration in ambient air is less than its comparison value, no adverse health effects are expected to occur. If a chemical concentration exceeds its comparison value it does not necessarily mean that adverse effects will occur, but rather that further evaluation is warranted.

All of the 84 VOCs were either not detected or were detected below their respective short-term AMCVs. Exposure to levels of VOCs measured in this sample would not be expected to cause short-term adverse health effects, adverse vegetative effects, or odors.

Please call me at (512) 239-1822 if you have any questions regarding this evaluation.

## Attachment A

### List of Target Analytes for Canister Samples

|                         |                               |                           |
|-------------------------|-------------------------------|---------------------------|
| ethane                  | 4-methyl-1-pentene            | t-1,3-dichloropropylene   |
| ethylene                | 1,1-dichloroethane            | 1,1,2-trichloroethane     |
| acetylene               | cyclopentane                  | 2,3,4-trimethylpentane    |
| propane                 | 2,3-dimethylbutane            | toluene                   |
| propylene               | 2-methylpentane               | 2-methylheptane           |
| dichlorodifluoromethane | 3-methylpentane               | 3-methylheptane           |
| methyl chloride         | 2-methyl-1-pentene + 1-hexene | 1,2-dibromoethane         |
| isobutane               | n-hexane                      | n-octane                  |
| vinyl chloride          | chloroform                    | tetrachloroethylene       |
| 1-butene                | t-2-hexene                    | chlorobenzene             |
| 1,3-butadiene           | c-2-hexene                    | ethylbenzene              |
| n-butane                | 1,2-dichloroethane            | m & p-xylene              |
| t-2-butene              | methylcyclopentane            | styrene                   |
| bromomethane            | 2,4-dimethylpentane           | 1,1,2,2-tetrachloroethane |
| c-2-butene              | 1,1,1-trichloroethane         | o-xylene                  |
| 3-methyl-1-butene       | benzene                       | n-nonane                  |
| isopentane              | carbon tetrachloride          | isopropylbenzene          |
| trichlorofluoromethane  | cyclohexane                   | n-propylbenzene           |
| 1-pentene               | 2-methylhexane                | m-ethyltoluene            |
| n-pentane               | 2,3-dimethylpentane           | p-ethyltoluene            |
| isoprene                | 3-methylhexane                | 1,3,5-trimethylbenzene    |
| t-2-pentene             | 1,2-dichloropropane           | o-ethyltoluene            |
| 1,1-dichloroethylene    | trichloroethylene             | 1,2,4-trimethylbenzene    |
| c-2-pentene             | 2,2,4-trimethylpentane        | n-decane                  |
| methylene chloride      | 2-chloropentane               | 1,2,3-trimethylbenzene    |
| 2-methyl-2-butene       | n-heptane                     | m-diethylbenzene          |
| 2,2-dimethylbutane      | c-1,3-dichloropropylene       | p-diethylbenzene          |
| cyclopentene            | methylcyclohexane             | n-undecane                |

## Attachment B

5/25/2011

### Texas Commission on Environmental Quality

Laboratory and Quality Assurance Section  
P.O. Box 13087, MC-165  
Austin, Texas 78711-3087  
(512) 239-1716

### Laboratory Analysis Results

ACL Number: 1105027

ACL Lead: Karen Bachtel  
Project(s): Barnett Shale

Region: T04

Date Received: 5/11/2011

| Facility(ies) Sampled | City    | County | Facility Type |
|-----------------------|---------|--------|---------------|
| Quicksilver Resources | Roanoke | Denton |               |

#### Laboratory Procedure(s) Performed:

Analysis: AMOR006

Determination of VOC Canisters by GC/MS Using Modified Method TO-15

#### Procedure:

Prior to analysis, subatmospheric samples are pressurized to twice the collected volume using a sample dilution system. For analysis, a known volume of a sample is directed from the canister into a multitrapp cryogenic concentrator. Internal standards are added to the sample stream prior to the trap. The concentrated sample is thermally desorbed and carried onto a GC column for separation. The analytical strategy involves using a GC with dual columns that are coupled to a mass selective detector (MSD) and a flame ionization detector (FID). Mass spectra for individual peaks in the total ion chromatogram are then used for target compound identification and quantitation. The fragmentation pattern is compared with stored spectra taken under similar conditions in order to identify the compound. For any given compound, the intensity of the quantitation fragment is compared with the system response to the fragment for known amounts of the compound. This establishes the compound concentration in the sample. For non-target compound peaks which are at least one-half the height of the internal standard, a library search is performed in an attempt to identify the compound solely upon fracture patterns. These tentatively identified compounds (TIC's) are reported as a sample specific footnote. Accurate quantitation of TICs is not possible. The FID is used for the quantitation of ethane, ethylene, acetylene, propylene and propane and identification is based on matching retention times of standards containing known analytes.

#### Sample(s) Received

Field ID Number: N1095

Laboratory Sample Number: 1105027-001

Sampled by: John Malik

Sampling Site: Alliance Tech Center B Pad

Date & Time Sampled: 05/05/11 12:14:00 Valid Sample: Yes

#### Comments:

Canister N1095 was used to collect a 30-minute sample using OFC-049.

Please note that this analytical technique is not capable of measuring all compounds which might have adverse health effects. For questions on the analytical procedures please contact the laboratory manager at (512) 239-4894. For an update on the health effects evaluation of these data, please contact the Toxicology Division at (512) 239-1795.

Analyst:

J.P. Loh

Date:

5/25/11

Reviewed By:

Karen Bachtel

Date:

5/26/2011

Technical Specialist:

David Manis

Date:

5/26/11

### Laboratory Analysis Results

ACL Number: 1105027

Analysis Code: AMOR006

Note: Results are reported in units of parts per billion by volume (ppbv)

| Lab ID                        |      | 1105027-001   |      |         |               |     |         |
|-------------------------------|------|---------------|------|---------|---------------|-----|---------|
| Field ID                      |      | N1095         |      |         |               |     |         |
| Canister ID                   |      | N1095         |      |         |               |     |         |
| Analysis Date                 |      | 05/16/11      |      |         |               |     |         |
| Compound                      | LOD  | Concentration | SDL  | Flags** | Concentration | SDL | Flags** |
| ethane                        | 0.50 | 3.5           | 1.0  | T,D1    |               |     |         |
| ethylene                      | 0.50 | ND            | 1.0  | T,D1    |               |     |         |
| acetylene                     | 0.50 | ND            | 1.0  | T,D1    |               |     |         |
| propane                       | 0.50 | 1.1           | 1.0  | L,T,D1  |               |     |         |
| propylene                     | 0.50 | ND            | 1.0  | T,D1    |               |     |         |
| dichlorodifluoromethane       | 0.20 | 0.63          | 0.40 | L,D1    |               |     |         |
| methyl chloride               | 0.20 | 0.66          | 0.40 | L,D1    |               |     |         |
| isobutane                     | 0.23 | 0.28          | 0.46 | J,D1    |               |     |         |
| vinyl chloride                | 0.17 | ND            | 0.34 | D1      |               |     |         |
| 1-butene                      | 0.20 | 0.13          | 0.40 | J,D1    |               |     |         |
| 1,3-butadiene                 | 0.27 | ND            | 0.54 | D1      |               |     |         |
| n-butane                      | 0.20 | 0.45          | 0.40 | L,D1    |               |     |         |
| i-2-butene                    | 0.18 | ND            | 0.36 | D1      |               |     |         |
| bromomethane                  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| c-2-butene                    | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 3-methyl-1-butene             | 0.23 | ND            | 0.46 | D1      |               |     |         |
| isopentane                    | 0.27 | 0.22          | 0.54 | J,D1    |               |     |         |
| trichlorofluoromethane        | 0.29 | 0.24          | 0.58 | J,D1    |               |     |         |
| 1-pentene                     | 0.27 | ND            | 0.54 | D1      |               |     |         |
| n-pentane                     | 0.27 | ND            | 0.54 | D1      |               |     |         |
| isoprene                      | 0.27 | 0.04          | 0.54 | J,D1    |               |     |         |
| i-2-pentene                   | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 1,1-dichloroethylene          | 0.18 | 0.11          | 0.36 | J,D1    |               |     |         |
| c-2-pentene                   | 0.25 | ND            | 0.50 | D1      |               |     |         |
| methylene chloride            | 0.14 | 0.08          | 0.28 | J,D1    |               |     |         |
| 2-methyl-2-butene             | 0.23 | ND            | 0.46 | D1      |               |     |         |
| 2,2-dimethylbutane            | 0.21 | 0.01          | 0.42 | J,D1    |               |     |         |
| cyclopentene                  | 0.20 | ND            | 0.40 | D1      |               |     |         |
| 4-methyl-1-pentene            | 0.22 | ND            | 0.44 | D1      |               |     |         |
| 1,1-dichloroethane            | 0.19 | ND            | 0.38 | D1      |               |     |         |
| cyclopentane                  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 2,3-dimethylbutane            | 0.28 | ND            | 0.56 | D1      |               |     |         |
| 2-methylpentane               | 0.27 | 0.04          | 0.54 | J,D1    |               |     |         |
| 3-methylpentane               | 0.23 | 0.03          | 0.46 | J,D1    |               |     |         |
| 2-methyl-1-pentene + 1-hexene | 0.20 | ND            | 0.40 | D1      |               |     |         |
| n-hexane                      | 0.20 | 0.05          | 0.40 | J,D1    |               |     |         |
| chloroform                    | 0.21 | 0.03          | 0.42 | J,D1    |               |     |         |
| i-2-hexene                    | 0.27 | ND            | 0.54 | D1      |               |     |         |
| c-2-hexene                    | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 1,2-dichloroethane            | 0.27 | ND            | 0.54 | D1      |               |     |         |
| methylcyclopentane            | 0.27 | 0.02          | 0.54 | J,D1    |               |     |         |
| 2,4-dimethylpentane           | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 1,1,1-trichloroethane         | 0.26 | ND            | 0.52 | D1      |               |     |         |
| benzene                       | 0.27 | 0.12          | 0.54 | J,D1    |               |     |         |
| carbon tetrachloride          | 0.27 | 0.09          | 0.54 | J,D1    |               |     |         |
| cyclohexane                   | 0.24 | ND            | 0.48 | D1      |               |     |         |
| 2-methylhexane                | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 2,3-dimethylpentane           | 0.26 | ND            | 0.52 | D1      |               |     |         |

### Laboratory Analysis Results

ACL Number: 1105027

Analysis Code: AMOR006

| Note: Results are reported in units of parts per billion by volume (ppbv) |      |               |      |         |               |     |         |
|---|------|---------------|------|---------|---------------|-----|---------|
| Lab ID  |      | 1105027-001   |      |         |               |     |         |
| Compound  | LOD  | Concentration | SDL  | Flags** | Concentration | SDL | Flags** |
| 3-methylhexane  | 0.20 | 0.02          | 0.40 | J,D1    |               |     |         |
| 1,2-dichloropropane   | 0.17 | ND            | 0.34 | D1      |               |     |         |
| trichloroethylene   | 0.29 | ND            | 0.58 | D1      |               |     |         |
| 2,2,4-trimethylpentane  | 0.24 | 0.02          | 0.48 | J,D1    |               |     |         |
| 2-chloropentane   | 0.27 | ND            | 0.54 | D1      |               |     |         |
| n-heptane   | 0.25 | 0.02          | 0.50 | J,D1    |               |     |         |
| c-1,3-dichloropropylene   | 0.20 | ND            | 0.40 | D1      |               |     |         |
| methylcyclohexane   | 0.26 | ND            | 0.52 | D1      |               |     |         |
| t-1,3-dichloropropylene   | 0.20 | ND            | 0.40 | D1      |               |     |         |
| 1,1,2-trichloroethane   | 0.21 | ND            | 0.42 | D1      |               |     |         |
| 2,3,4-trimethylpentane  | 0.24 | 0.01          | 0.48 | J,D1    |               |     |         |
| toluene   | 0.27 | 0.08          | 0.54 | J,D1    |               |     |         |
| 2-methylheptane   | 0.20 | ND            | 0.40 | D1      |               |     |         |
| 3-methylheptane   | 0.23 | ND            | 0.46 | D1      |               |     |         |
| 1,2-dibromoethane   | 0.20 | 0.07          | 0.40 | J,D1    |               |     |         |
| n-octane  | 0.19 | ND            | 0.38 | D1      |               |     |         |
| tetrachloroethylene   | 0.24 | 0.01          | 0.48 | J,D1    |               |     |         |
| chlorobenzene   | 0.27 | ND            | 0.54 | D1      |               |     |         |
| ethylbenzene  | 0.27 | 0.08          | 0.54 | J,D1    |               |     |         |
| m & p-xylene  | 0.27 | 0.02          | 0.54 | J,D1    |               |     |         |
| styrene   | 0.27 | 0.06          | 0.54 | J,D1    |               |     |         |
| 1,1,1,2-tetrachloroethane   | 0.20 | ND            | 0.40 | D1      |               |     |         |
| o-xylene  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| n-nonane  | 0.22 | ND            | 0.44 | D1      |               |     |         |
| isopropylbenzene  | 0.24 | 0.03          | 0.48 | J,D1    |               |     |         |
| n-propylbenzene   | 0.27 | ND            | 0.54 | D1      |               |     |         |
| m-ethyltoluene  | 0.11 | ND            | 0.22 | D1      |               |     |         |
| p-ethyltoluene  | 0.16 | ND            | 0.32 | D1      |               |     |         |
| 1,3,5-trimethylbenzene  | 0.25 | ND            | 0.50 | D1      |               |     |         |
| o-ethyltoluene  | 0.13 | ND            | 0.26 | D1      |               |     |         |
| 1,2,4-trimethylbenzene  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| n-decane  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| 1,2,3-trimethylbenzene  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| m-diethylbenzene  | 0.27 | ND            | 0.54 | D1      |               |     |         |
| p-diethylbenzene  | 0.27 | 0.02          | 0.54 | J,D1    |               |     |         |
| n-undecane  | 0.27 | ND            | 0.54 | D1      |               |     |         |

**Laboratory Analysis Results**

ACL Number: 1105027

Analysis Code: AMOR006

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**Quality Control Notes:**

quality control notes for sample 1105027-001.

D1-sample concentration was calculated using a dilution factor of 4.02

TCEQ laboratory customer support may be reached at [kbachtel@tceq.state.tx.us](mailto:kbachtel@tceq.state.tx.us)

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**Table 1. Comparison of Monitored Concentrations in Lab Sample 1105027-001 to TCEQ Short-Term AMCVs**

| Lab Sample ID                     | 1105027-001                   |  |                         |                                    |       |                         |
|-----------------------------------|-------------------------------|--|-------------------------|------------------------------------|-------|-------------------------|
| Compound                          | Odor AMCV (ppb <sub>v</sub> ) | Short-Term Health AMCV (ppb <sub>v</sub> ) | LOD (ppb <sub>v</sub> ) | Concentrations (ppb <sub>v</sub> ) | Flags | SDL (ppb <sub>v</sub> ) |
| 1,1,1-Trichloroethane             | 380,000                       | 1,700                                      | 0.26                    | ND                                 | D1    | 0.52                    |
| 1,1,2,2-Tetrachloroethane         | 7,300                         | 10   | 0.2                     | ND                                 | D1    | 0.4                     |
| 1,1,2-Trichloroethane             | Not Available                 | 100  | 0.21                    | ND                                 | D1    | 0.42                    |
| 1,1-Dichloroethane                | 110,000                       | 1,000                                      | 0.19                    | ND                                 | D1    | 0.38                    |
| 1,1-Dichloroethylene              | Not Available                 | 180  | 0.18                    | 0.11                               | J,D1  | 0.36                    |
| 1,2,3-Trimethylbenzene            | Not Available                 | 250  | 0.27                    | ND                                 | D1    | 0.54                    |
| 1,2,4-Trimethylbenzene            | Not Available                 | 250  | 0.27                    | ND                                 | D1    | 0.54                    |
| 1,2-Dibromoethane                 | 10,000                        | 0.5  | 0.2                     | 0.07                               | J,D1  | 0.4                     |
| 1,2-Dichloroethane                | 6,000                         | 40   | 0.27                    | ND                                 | D1    | 0.54                    |
| 1,2-Dichloropropane               | 250                           | 100  | 0.17                    | ND                                 | D1    | 0.34                    |
| 1,3,5-Trimethylbenzene            | Not Available                 | 250  | 0.25                    | ND                                 | D1    | 0.5                     |
| 1,3-Butadiene                     | 230                           | 1,700                                      | 0.27                    | ND                                 | D1    | 0.54                    |
| 1-Butene                          | 360                           | 50,000                                     | 0.2                     | 0.13                               | J,D1  | 0.4                     |
| 1-Pentene                         | 100                           | 2,600                                      | 0.27                    | ND                                 | D1    | 0.54                    |
| 2,2,4-Trimethylpentane            | Not Available                 | 750  | 0.24                    | 0.02                               | J,D1  | 0.48                    |
| 2,2-Dimethylbutane (Neohexane)    | Not Available                 | 1,000                                      | 0.21                    | 0.01                               | J,D1  | 0.42                    |
| 2,3,4-Trimethylpentane            | Not Available                 | 750  | 0.24                    | 0.01                               | J,D1  | 0.48                    |
| 2,3-Dimethylbutane                | Not Available                 | 990  | 0.28                    | ND                                 | D1    | 0.56                    |
| 2,3-Dimethylpentane               | Not Available                 | 850  | 0.26                    | ND                                 | D1    | 0.52                    |
| 2,4-Dimethylpentane               | 290,000                       | 850  | 0.27                    | ND                                 | D1    | 0.54                    |
| 2-Chloropentane (as chloroethane) | Not Available                 | 190  | 0.27                    | ND                                 | D1    | 0.54                    |
| 2-Methyl-1-Pentene +1-Hexene      | 20                            | 500  | 0.2                     | ND                                 | D1    | 0.4                     |
| 2-Methyl-2-Butene                 | 250                           | 500  | 0.23                    | ND                                 | D1    | 0.46                    |
| 2-Methylheptane                   | Not Available                 | 750  | 0.2                     | ND                                 | D1    | 0.4                     |



| Lab Sample ID                   | 1105027-001                   |  |                         |                                    |       |                         |
|---------------------------------|-------------------------------|--|-------------------------|------------------------------------|-------|-------------------------|
| Compound                        | Odor AMCV (ppb <sub>v</sub> ) | Short-Term Health AMCV (ppb <sub>v</sub> ) | LOD (ppb <sub>v</sub> ) | Concentrations (ppb <sub>v</sub> ) | Flags | SDL (ppb <sub>v</sub> ) |
| 2-Methylhexane                  | Not Available                 | 750  | 0.27                    | ND                                 | D1    | 0.54                    |
| 2-Methylpentane (Isohexane)     | 83                            | 1,000                                      | 0.27                    | 0.04                               | J,D1  | 0.54                    |
| 3-Methyl-1-Butene               | 250                           | 8,000                                      | 0.23                    | ND                                 | D1    | 0.46                    |
| 3-Methylheptane                 | Not Available                 | 750  | 0.23                    | ND                                 | D1    | 0.46                    |
| 3-Methylhexane                  | Not Available                 | 750  | 0.2                     | 0.02                               | J,D1  | 0.4                     |
| 3-Methylpentane                 | Not Available                 | 1000                                       | 0.23                    | 0.03                               | J,D1  | 0.46                    |
| 4-Methyl-1-Pentene (as hexene)  | 20                            | 500  | 0.22                    | ND                                 | D1    | 0.44                    |
| Acetylene                       | 620000                        | 25000                                      | 0.5                     | ND                                 | T,D1  | 1                       |
| Benzene                         | 2700                          | 180  | 0.27                    | 0.12                               | J,D1  | 0.54                    |
| Bromomethane (methyl bromide)   | 21000                         | 30   | 0.27                    | ND                                 | D1    | 0.54                    |
| c-1,3-Dichloropropylene         | Not Available                 | 10   | 0.2                     | ND                                 | D1    | 0.4                     |
| c-2-Butene                      | 2100                          | 15000                                      | 0.27                    | ND                                 | D1    | 0.54                    |
| c-2-Hexene                      | Not Available                 | 500  | 0.27                    | ND                                 | D1    | 0.54                    |
| c-2-Pentene                     | Not Available                 | 2600                                       | 0.25                    | ND                                 | D1    | 0.5                     |
| Carbon Tetrachloride            | 97000                         | 20   | 0.27                    | 0.09                               | J,D1  | 0.54                    |
| Chlorobenzene (phenyl chloride) | 210                           | 100  | 0.27                    | ND                                 | D1    | 0.54                    |
| Chloroform (trichloromethane)   | 85,000                        | 20   | 0.21                    | 0.03                               | J,D1  | 0.42                    |
| Cyclohexane                     | 420                           | 1,000                                      | 0.24                    | ND                                 | D1    | 0.48                    |
| Cyclopentane                    | Not Available                 | 1,200                                      | 0.27                    | ND                                 | D1    | 0.54                    |
| Cyclopentene                    | Not Available                 | 2,900                                      | 0.2                     | ND                                 | D1    | 0.4                     |
| Dichlorodifluoromethane         | Not Available                 | 10,000                                     | 0.2                     | 0.63                               | L,D1  | 0.4                     |
| Ethane                          | 180,000                       | Simple Asphyxiant*                         | 0.5                     | 3.5                                | T,D1  | 1                       |
| Ethylbenzene                    | 170                           | 20,000                                     | 0.27                    | 0.08                               | J,D1  | 0.54                    |
| Ethylene                        | 270,000                       | 500,000                                    | 0.5                     | ND                                 | T,D1  | 1                       |
| Isobutane                       | 2,040                         | 8,000                                      | 0.23                    | 0.28                               | J,D1  | 0.46                    |
| Isopentane (2-methylbutane)     | 1,300                         | 68,000                                     | 0.27                    | 0.22                               | J,D1  | 0.54                    |

| Lab Sample ID                        | 1105027-001                   |  |                         |                                    |        |                         |
|--------------------------------------|-------------------------------|--|-------------------------|------------------------------------|--------|-------------------------|
| Compound                             | Odor AMCV (ppb <sub>v</sub> ) | Short-Term Health AMCV (ppb <sub>v</sub> ) | LOD (ppb <sub>v</sub> ) | Concentrations (ppb <sub>v</sub> ) | Flags  | SDL (ppb <sub>v</sub> ) |
| Isoprene                             | 5                             | 20   | 0.27                    | 0.04                               | J,D1   | 0.54                    |
| Isopropylbenzene (cumene)            | 100                           | 500  | 0.24                    | 0.03                               | J,D1   | 0.48                    |
| m & p-Xylene (as mixed isomers)      | 80                            | 1,700                                      | 0.27                    | 0.02                               | J,D1   | 0.54                    |
| m-Diethylbenzene                     | 70                            | 460  | 0.27                    | ND                                 | D1     | 0.54                    |
| Methyl Chloride (chloromethane)      | Not Available                 | 500  | 0.2                     | 0.66                               | L,D1   | 0.4                     |
| Methylcyclohexane                    | 150                           | 4,000                                      | 0.26                    | ND                                 | D1     | 0.52                    |
| Methylcyclopentane                   | 1,700                         | 750  | 0.27                    | 0.02                               | J,D1   | 0.54                    |
| Methylene Chloride (dichloromethane) | 160,000                       | 3,500                                      | 0.14                    | 0.08                               | J,D1   | 0.28                    |
| m-Ethyltoluene                       | 18                            | 250  | 0.11                    | ND                                 | D1     | 0.22                    |
| n-Butane                             | 1,200,000                     | 8,000                                      | 0.2                     | 0.45                               | L,D1   | 0.4                     |
| n-Decane                             | 620                           | 1,750                                      | 0.27                    | ND                                 | D1     | 0.54                    |
| n-Heptane                            | 670                           | 850  | 0.25                    | 0.02                               | J,D1   | 0.5                     |
| n-Hexane                             | 1,500                         | 1,800                                      | 0.2                     | 0.05                               | J,D1   | 0.4                     |
| n-Nonane                             | 2,200                         | 2,000                                      | 0.22                    | ND                                 | D1     | 0.44                    |
| n-Octane                             | 1,700                         | 750  | 0.19                    | ND                                 | D1     | 0.38                    |
| n-Pentane                            | 1,400                         | 68,000                                     | 0.27                    | ND                                 | D1     | 0.54                    |
| n-Propylbenzene                      | 3.8                           | 250  | 0.27                    | ND                                 | D1     | 0.54                    |
| n-Undecane                           | Not Available                 | 550  | 0.27                    | ND                                 | D1     | 0.54                    |
| o-Ethyltoluene                       | Not Available                 | 250  | 0.13                    | ND                                 | D1     | 0.26                    |
| o-Xylene                             | 380                           | 1,700                                      | 0.27                    | ND                                 | D1     | 0.54                    |
| p-Diethylbenzene                     | 0.39                          | 460  | 0.27                    | 0.02                               | J,D1   | 0.54                    |
| p-Ethyltoluene                       | 8.3                           | 250  | 0.16                    | ND                                 | D1     | 0.32                    |
| Propane                              | 1,500,000                     | Simple Asphyxiant*                         | 0.5                     | 1.1                                | L,T,D1 | 1                       |
| Propylene                            | 13,000                        | Simple Asphyxiant*                         | 0.5                     | ND                                 | T,D1   | 1                       |
| Styrene                              | 25                            | 5,100                                      | 0.27                    | 0.06                               | J,D1   | 0.54                    |
| t-1,3-Dichloropropylene              | Not Available                 | 10   | 0.2                     | ND                                 | D1     | 0.4                     |

| Lab Sample ID          | 1105027-001      |                               |            |                       |       |            |
|------------------------|------------------|-------------------------------|------------|-----------------------|-------|------------|
| Compound               | Odor AMCV (ppbv) | Short-Term Health AMCV (ppbv) | LOD (ppbv) | Concentrations (ppbv) | Flags | SDL (ppbv) |
| t-2-Butene             | 2,100            | 15,000                        | 0.18       | ND                    | D1    | 0.36       |
| t-2-Hexene             | Not Available    | 500                           | 0.27       | ND                    | D1    | 0.54       |
| t-2-Pentene            | Not Available    | 2,600                         | 0.27       | ND                    | D1    | 0.54       |
| Tetrachloroethylene    | 770              | 1,000                         | 0.24       | 0.01                  | J,D1  | 0.48       |
| Toluene                | 170              | 4,000                         | 0.27       | 0.08                  | J,D1  | 0.54       |
| Trichloroethylene      | 3,900            | 100                           | 0.29       | ND                    | D1    | 0.58       |
| Trichlorofluoromethane | 5,000            | 10,000                        | 0.29       | 0.24                  | J,D1  | 0.58       |
| Vinyl Chloride         | Not Available    | 26,000                        | 0.17       | ND                    | D1    | 0.34       |

\*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.

ppbv - Parts per billion by volume.

ND - Not detected.

NQ - Concentration can not be quantified.

LOD - Limit of detection.

SDL - Sample Detection Limit (LOD adjusted for dilutions).

INV - Invalid.

J - Reported concentration is below SDL.

L - Reported concentration is at or above the SDL and is below the lower limit of quantitation.

E - Reported concentration exceeds the upper limit of instrument calibration.

M - Result modified from previous result.

T - Data was not confirmed by a confirmational analysis. Data is tentatively identified.

D1 - Sample concentration was calculated using a dilution factor of 4.02.

**Table 2. TCEQ Long-Term Air Monitoring Comparison Values (AMCVs)**

**Please Note: The long-term AMCVs are provided for informational purposes only because it is scientifically inappropriate to compare short-term monitored values to the long-term AMCV.**

| Compound                          | Long-Term Health AMCV (ppb <sub>v</sub> ) | Compound                             | Long-Term Health AMCV (ppb <sub>v</sub> ) |
|-----------------------------------|---|--------------------------------------|---|
| 1,1,1-Trichloroethane             | 940                                       | Cyclopentane                         | 120                                       |
| 1,1,2,2-Tetrachloroethane         | 1   | Cyclopentene                         | 290                                       |
| 1,1,2-Trichloroethane             | 10  | Dichlorodifluoromethane              | 1,000                                     |
| 1,1-Dichloroethane                | 100                                       | Ethane                               | Simple Asphyxiant*                        |
| 1,1-Dichloroethylene              | 86  | Ethylbenzene                         | 450                                       |
| 1,2,3-Trimethylbenzene            | 25  | Ethylene**                           | 5,300                                     |
| 1,2,4-Trimethylbenzene            | 25  | Isobutane                            | 800                                       |
| 1,2-Dibromoethane                 | 0.05                                      | Isopentane (2-methylbutane)          | 8,000                                     |
| 1,2-Dichloroethane                | 1   | Isoprene                             | 2   |
| 1,2-Dichloropropane               | 10  | Isopropylbenzene (cumene)            | 50  |
| 1,3,5-Trimethylbenzene            | 25  | m & p-Xylene (as mixed isomers)      | 140                                       |
| 1,3-Butadiene                     | 9.1                                       | m-Diethylbenzene                     | 46  |
| 1-Butene                          | Not Available                             | Methyl Chloride (chloromethane)      | 50  |
| 1-Pentene                         | Not Available                             | Methylcyclohexane                    | 400                                       |
| 2,2,4-Trimethylpentane            | 75  | Methylcyclopentane                   | 75  |
| 2,2-Dimethylbutane (Neohexane)    | 100                                       | Methylene Chloride (dichloromethane) | 100                                       |
| 2,3,4-Trimethylpentane            | 75  | m-Ethyltoluene                       | 25  |
| 2,3-Dimethylbutane                | 99  | n-Butane                             | 800                                       |
| 2,3-Dimethylpentane               | 85  | n-Decane                             | 175                                       |
| 2,4-Dimethylpentane               | 85  | n-Heptane                            | 85  |
| 2-Chloropentane (as chloroethane) | 19  | n-Hexane                             | 190                                       |
| 2-Methyl-1-Pentene +1-Hexene      | 50  | n-Nonane                             | 200                                       |

| Compound                        | Long-Term Health<br>AMCV (ppb <sub>v</sub> ) | Compound                | Long-Term Health<br>AMCV (ppb <sub>v</sub> ) |
|---------------------------------|--|-------------------------|--|
| 2-Methyl-2-Butene               | 50   | n-Octane                | 75   |
| 2-Methylheptane                 | 75   | n-Pentane               | 8,000  |
| 2-Methylhexane                  | 75   | n-Propylbenzene         | 25   |
| 2-Methylpentane (Isohexane)     | 100  | n-Undecane              | 55   |
| 3-Methyl-1-Butene               | 800  | o-Ethyltoluene          | 25   |
| 3-Methylheptane                 | 75   | o-Xylene                | 140  |
| 3-Methylhexane                  | 75   | p-Diethylbenzene        | 46   |
| 3-Methylpentane                 | 100  | p-Ethyltoluene          | 25   |
| 4-Methyl-1-Pentene (as hexene)  | 50   | Propane                 | Simple Asphyxiant*                           |
| Acetylene                       | 2,500  | Propylene               | Simple Asphyxiant*                           |
| Benzene                         | 1.4  | Styrene                 | 110  |
| Bromomethane (methyl bromide)   | 3  | t-1,3-Dichloropropylene | 1  |
| c-1,3-Dichloropropylene         | 1  | t-2-Butene              | Not Available                                |
| c-2-Butene                      | Not Available                                | t-2-Hexene              | 50   |
| c-2-Hexene                      | 50   | t-2-Pentene             | Not Available                                |
| c-2-Pentene                     | Not Available                                | Tetrachloroethylene***  | 3.8  |
| Carbon Tetrachloride            | 2  | Toluene                 | 1,100  |
| Chlorobenzene (phenyl chloride) | 10   | Trichloroethylene       | 10   |
| Chloroform (trichloromethane)   | 2  | Trichlorofluoromethane  | 1,000  |
| Cyclohexane                     | 100  | Vinyl Chloride          | 0.45   |

\*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.

\*\*Long-term vegetation AMCV for Ethylene is 30 ppb.

\*\*\*Long-term vegetation AMCV for Tetrachloroethylene is 12 ppb.